Secondly, it is recommended that universities and medical schools offer one or more courses of study with two or three hour periods once or twice a week at a time of day which will make possible the attendance of persons employed by various kinds of health agencies. Courses are now offered, of course, by a number of medical schools which would be of great value to sanitarians now employed were the availability of these courses brought to their attention. Finally, it is expected as a result of the interest demonstrated by sanitarians this year, that Columbia University, the University of Michigan and possibly two or three other institutions will conduct in 1925 public health summer schools of a similar nature.

THE *Journal* of the American Medical Association states that the minister of labor has published the vital statistics for France during the first three months of 1923 and for the corresponding period in 1924: During the first quarter, the number of marriages was nearly 10 per cent. higher than for the corresponding period in 1923. The number of living births has remained about stationary; also infant mortality. The total number of deaths, however, has risen from 190,036 to 219,045, but the same thing is true of other countries. In England, for example, the number of deaths has risen from 124,720, during the first quarter of 1923, to 160,279 for the first three months of 1924. Nevertheless, the demographic situation of France during the first quarter of the current year was deplorable, since it resulted in an excess of deaths over births of 24,039, as compared with an excess of births over deaths of 6,069 in 1923.

UNIVERSITY AND EDUCATIONAL NOTES

THE College of the Pacific is now moving from San Jose, California, to Stockton, California, where seven new buildings are being completed at a cost of $750,000. The science building will be well equipped for physics, chemistry and biology.

THE Miners' Welfare Committee, England, has made a grant of £2,250 toward the equipment of the mining department of the Royal Technical College, Glasgow.

MR. BLUMENTHAL, of New York, as further evidence of his interest in French universities, has presented to the Sorbonne, Paris, a gift of 250,000 francs.

PROFESSOR A. F. GREAVES-WALKER, ceramic engineer, vice-president and director of the Stevens Bros. Co., Ga., has been appointed director of the new department of ceramic engineering to be established at the North Carolina State College during the coming school year.

DR. J. A. ELDRIDGE, of the General Electric Company and formerly of the University of Wisconsin, has been appointed an associate professor of physics at the University of Iowa.

DR. E. F. PHILLIPS, who has been in charge of the Beekeeping Investigations of the Bureau of Entomology for the past nineteen years, has accepted a professorship in apiculture at the New York State College of Agriculture, at Cornell University, and will begin his work there about October 1.

AT Barnard College, Columbia University, Dr. Louis H. Gregory has been promoted to associate professor of zoology, and Miss Grace Sangford to assistant professor of physics.

DR. NICHOLAS M. ALTER, instructor of medicine at the University of Michigan Medical School, has been appointed professor of pathology at the University of Colorado.

DR. GEORGE B. ROTH, assistant professor of pharmacology in Western Reserve University, has been appointed professor of physiology and pharmacology in the George Washington University Medical School, Washington, D. C.

DR. HERBERT W. ROGERS, assistant professor of psychology at the University of Minnesota, has been appointed assistant professor and director of the laboratory of psychology at Lafayette College to fill the vacancy created by the resignation of Dr. Gilliland, who goes to Northwestern University.

PROFESSOR S. CHAPMAN, professor of applied mathematics at the University of Manchester, has been appointed professor of mathematics at the Imperial College of Science, South Kensington.

DR. ALFRED KUHN, professor of zoology at the University of Göttingen, has been appointed professor of zoology and comparative anatomy at Munich, to take the place of Professor R. V. Hertwig, who has resigned.

DISCUSSION AND CORRESPONDENCE

NOTE ON THE RELATIVITY MOTION OF MERCURY

ACCORDING to the formulas of relativity as given by Eddington the perihelion of a planet's orbit moves forward in each revolution by an amount,

$$6\pi \frac{m}{p},$$

where p is the parameter of the orbit and m, *"the gravitational mass of the sun is approximately 1.5 km."*

With this value of m, the motion of Mercury's apse-line is computed by the relativists as being 43

seconds of arc per century. But this value of m, namely 1.50 kms., depends entirely upon the choice of the fundamental units of length and time. For, in celestial dynamics, mass is a derived unit and involves the units of time and distance. This relation is well known and is given by Eddington in the form:

$$m = v^2 r,$$

where r is the distance of any planet from the sun and v is the velocity of the planet in its orbit.

This expression for the mass of the sun will become linear when v is expressed as the ratio of velocities, is expressed in terms of some arbitrary unit of velocity. The numerical value of m will, therefore, vary according as to what is assumed as 'unit velocity." But unit velocity is the distance travelled in unit time, and hence "unit velocity" depends upon the system of units adopted for length and time.

In ordinary astronomical convention, the unit of length is the distance of the earth from the sun and the unit of time is the *mean solar day*. Using this system of units, the mass of the sun, expressed linearly, becomes:

$$m = 44{,}800 \text{ kms.}$$

With the ordinary system of units of the physical laboratory, in which the *centimeter* is the unit of length and the *second* is the unit of time, this linear value of the mass of the sun becomes:

$$m = 13.5 \times 10^{20} \text{ kms.}$$

The relativity system of units, adopted by the relativists, is adjusted so as to make the velocity of light "unity": in this system, therefore, the unit of length is the *kilometer* and the unit of time is the *1/300,000th part of a second*. And in this system of units, the linear value of the mass of the sun is expressed by:

$$m = 1.50 \text{ kms.}$$

as given by Eddington.

Now, when these various values for the "linear mass" of the sun, or for the constant m of relativity, are substituted in the formula for the motion of the apse-line, the respective motions of the perihelion of Mercury in one century become:

For astronomical units,	this motion becomes 357°, or very nearly a complete revolution.
For physical units,	this motion becomes 3×10^{16} complete revolutions: or the orbit is revolving at the rate of 9.5×10^{6} complete revolutions *per second*.
For relativity units,	this motion becomes the celebrated 43 seconds of arc.

Thus, if the m in the relativity formula for the motion of the perihelion represents the *"gravitational mass of the sun,"* as stated and claimed by the relativists, then the relativity motion of a planetary orbit depends entirely upon the system of fundamental units adopted for measuring length and time; depends absolutely upon what is called "unit velocity." Can such a motion, a motion which changes with the units employed, represent a physical fact? Is it not, rather, purely a mathematical illusion, due to an erroneous interpretation of an equation?

CHARLES LANE POOR

COLUMBIA UNIVERSITY,
May, 1924

WAXY ENDOSPERM IN NEW ENGLAND MAIZE

THE peculiar type of endosperm texture in maize, familiar to geneticists as "waxy," which has previously been found only in isolated localities in China, Burma and the Philippines,[1] has recently appeared in a New England variety grown at the Connecticut Agricultural Experiment Station.

Waxy seeds were found by Dr. D. F. Jones in the fall of 1922 on two hand pollinated ears of Sanford's White Flint which were segregating in the proportion of 3 starchy: 1 waxy. Both of these ears are the progeny of a single open pollinated ear which had been received in a lot of 25 ears of this variety obtained from a farmer near Kent, Connecticut, in the spring of 1922.

The recessive seeds from one of the segregating ears were planted in 1923 and crosses were made with a waxy strain secured from Mr. G. N. Collins, of the Bureau of Plant Industry, who had obtained this type originally from Shanghai, China. When pollen from the Chinese waxy was applied to the silks of the New England waxy, only pure waxy seeds resulted, proving that the two strains are genetically identical in their type of endosperm.

As far as is known the only waxy maize ever grown in Connecticut is the Chinese strain, which has been used in genetic investigations on the experiment station farm for a number of years. No corn of any kind has ever been sent from the station to the locality from which the ears of Sanford's White Flint were obtained, and it is scarcely possible that the appearance of waxy endosperm in this variety is due to previous crossing with the Chinese waxy. Nor is there any indication that the strain in which waxy has appeared has undergone recent crossing with such a widely different sort as the Chinese strain. Sanford's White Flint is an old and well-

[1] G. N. Collins, "Waxy maize from Upper Burma," SCIENCE, N. S., Vol. LII, No. 1333, pp. 48–51, July 16, 1920.